



DEPARTMENT OF VETERANS AFFAIRS
Veterans Health Administration
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UNDER SECRETARY FOR HEALTH'S INFORMATION LETTER

MYIASIS

1. Background. Myiasis is the condition of infestation of the body by fly larvae (maggots). Myiasis is a worldwide issue that concerns every hospital and health care facility. The complexity of health care, the aging of the population, and the severity of illness of many patients in health care facilities creates a venue in which myiasis can occur. While the adverse patient care consequences of myiasis in the United States are almost always modest, the other implications can be prominent. It is reasonable, therefore, to provide information regarding myiasis with particular emphasis on prevention and intervention if myiasis is discovered. While intestinal myiasis and orbital myiasis are also known to occur, this Information Letter addresses primarily the cutaneous form.

2. Prevention. There are two components to the issue of myiasis prevention. The first is the care (inside and outside the health care facility) of at-risk patients to prevent infestation, particularly related to chronic skin lesions, and the second is the environment of care that could influence the potential occurrence of myiasis.

a. Prevention in Patients with Chronic Skin Lesions and Wounds

(1) Most flies that cause myiasis deposit eggs or larvae directly onto the host at predisposed sites, such as chronic wounds and necrotic or infected tissue. Blood, body fluids, body substances, excrement, and volatile products of putrefaction act as olfactory attractants for common flies. **NOTE:** *Healthy hosts are at less risk for myiasis.*

(2) To prevent myiasis in wounds, the following recommendations are provided:

(a) Standardized wound care needs to be established through policy, protocol, procedure, and/or a dedicated wound care team.

(b) Wounds heal better in a moist and covered environment, rather than an open and dry environment.

(c) Chronic wounds, regardless of their etiology, need to be dressed at all times. **NOTE:** *Wounds need to be covered when patients go outside, even for short periods of time.*

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(d) In general, dressings need to be changed and the wound visually inspected daily.

(e) Dressings that are leaking, wet, or malodorous need to be promptly replaced with clean dressings.

(f) Even small cuts and abrasions need to be covered.

(g) A total skin examination needs to be performed on all patients. This is especially important for patients having and/or at risk for developing skin lesions and wounds.

(h) Staff, patients, and families need to be educated about proper wound care.

(3) Other patients at risk for myiasis include those with depressed levels of consciousness, decreased mobility, poor oral and/or nasal hygiene, incontinence, a skin barrier interrupted with any type of medical appliance (e.g., tracheotomy tube, drain), and the homeless.

b. Environment of Care. The key to prevention of myiasis in a health care facility is to minimize the number of flies that come into contact with patients. This is a complex issue that involves multiple services throughout the facility. Both the external and internal environment of the facility need to be considered. Of critical importance is the fact that fly reduction is everyone's responsibility, since even small sites where flies can multiply can dramatically increase the number of flies in the facility. Attachment A gives strategies for decreasing the fly population in and around health care facilities. Ongoing attention and monitoring is critical to the success of fly prevention programs. Such an ongoing prevention program is the linchpin for myiasis control in a facility. As a component of the prevention program, the importance of cleanliness and sanitation within the facility and outside the facility cannot be overstated. Specifically, cleanliness and sanitation cannot be considered merely an aesthetic need, but they are critical to the well-being of everyone in the facility. A specific cleaning regimen, including cleaning intervals and protocols, needs to be in place with continued vigilance that all is being accomplished as planned. Sample protocols can be found in the Environmental Services Procedure Guide (<http://vaww.vhaco.va.gov/dushom/eps/2005EMS/whnjs.htm>). **NOTE:** *Sample cleaning frequencies can be found in the Emerging Pathogens Guidebook, Environmental Cleaning and Sanitation, Table 1: Cleaning Frequencies, at Web site http://vaww.ceosh.med.va.gov/Guidebooks/GB8/Em_Path.htm.*

3. Pest Control. Pest control is critical to prevention of myiasis and mitigation of the problem if it occurs. Attachment A provides some examples of programmatic initiatives that can be useful in dealing with flies. Pest control is not only the pest control officer's responsibility, it is everyone's responsibility. Even small areas that allow amplification of the fly population can increase the risk of myiasis in the facility. Everyone is encouraged to contribute to the cleanliness and sanitation of the facility. In addition, structural components of the facility are important with particular emphasis on areas where flies can enter the premises. Overall, an integrated approach to pest management that uses multiple modalities with contribution by all Department of Veterans Affairs (VA) employees is the goal of a myiasis prevention and mitigation program.

4. Education. Education regarding prevention and control of myiasis is critical to an overall facility program. The education needs to include all levels of VA staff, since everyone has a contribution to make to prevent the occurrence of myiasis. It may be cost effective and appropriate to combine education for myiasis with education for other infestations, such as scabies, lice, and potentially disease-associated vectors such as bats and rodents. Generally, information regarding these issues is not well known, and all staff would likely benefit from more information.

5. Intervention

a. If human myiasis occurs, intervention strategies need to be carried out on multiple levels. Several considerations are to be kept in mind. Care for the patient is the first priority; this is described in paragraph 6. The second issue is mitigation of the factors contributing to, or associated, with the infestation. Since health care-associated myiasis is generally related to a source of flies, mitigation needs to begin by addressing that situation. Attachment A identifies some strategies for fly management.

b. It is appropriate to appoint a single person to lead the mitigation effort at the local site. This ensures organizational continuity in the abatement efforts. Areas for coordination of efforts include: infection prevention and control, pest control, the environment of care, facilities management, and, as needed, public relations to address issues regarding myiasis. Senior leadership needs to be closely involved with the entire process, since specific actions may require focused management support. The mitigation effort needs to be initiated quickly since factors contributing to the infestation, such as spoiled food in a drawer or a propped-open door, may be transitory; identification of the contributing factors to the infestation can serve to educate personnel on the prevention of myiasis. Follow-up is necessary to ensure that identified problems are rapidly and efficiently resolved.

c. The identification of the specific genus and species of the larva(e) is often appropriate. Identification of the specific organism can be important to local and overall VA risk management. In rare cases, identification may influence individual patient care and/or the pest control effort if an organism is found. It is important to participate in any fly larval identification effort if it is being done for the purposes of public health in a geographic area that includes VA and non-VA facilities. The following procedures may be used to prepare larvae for identification:

(1) Upon removal from the patient, several larvae need to be placed in alcohol or formalin and sent to Pathology, as done for any other clinical specimen from a patient, to generate an official pathology report and for future reference or identification.

(2) Identification is somewhat complex since dead fly larvae may be difficult to identify, even by an experienced entomologist. Therefore, it is appropriate to send live larvae to an available facility with the expertise to nurture the larvae to mature, identifiable flies. Sending live larvae is complex in that it necessitates careful transport of the live larvae to the facility.

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NOTE: VHA Program Guide 1850.2 Integrated Pest Management (IPM), at Web site http://vaww1.va.gov/vhapublications/ViewPublication.asp?pub_ID=1093 lists contact numbers for the individual states where organism identification could potentially be accomplished. Specific instruction on how to ship the larvae can be obtained from the facility to which they are being sent.

(3) Whether or not live larvae are submitted for identification, larvae need to be preserved and sent to Pathology as described in subparagraphs 5c(1) and 5c(2).

6. Patient Care. If fly larvae are found on a patient, they need to be removed. While the beneficial effects of such an infestation for cleaning a wound may be medically relevant, this treatment is only done using laboratory-reared, disinfected fly larvae. Leaving fly larvae in a wound after a natural infestation for their putative benefit is not a general standard of care.

(1) There are multiple modalities suggested for removing fly larvae from lesions or wounds. A clinically reasonable approach follows:

(a) Use standard precautions, including gloved hands;

(b) Moisturize gauze with sterile saline, hydrogen peroxide (3 percent), or Dakin's solution, and wipe the larvae off the wound; and

(c) Dispose of the wet gauze and the organisms in appropriate waste containers. (see subpar. 5c.(1)).

(2) To deal with any remaining organisms, the wound can be soaked for 20 minutes using one part hydrogen peroxide (3 percent) mixed with four or five parts of room temperature sterile saline or sterile water. The wound can then be irrigated with sterile water or sterile saline. All of these modalities are more difficult if the wound is in a complex location, rather than on an extremity. In all cases, consultation needs to be obtained from Dermatology and/or Surgery and/or a wound care specialist to ensure that care for the individual patient is optimized.

(3) Patients need to be treated with antibiotics only if there is indication of bacterial infection.

(4) With regard to the linen from a patient who may have, or may have had, a larval infestation, it is to be handled in the same manner as used for all soiled hospital linen. All soiled hospital linen is considered contaminated. Standard precautions need to be used in dealing with the linen associated with patients with myiasis. The laundering process, following VA specifications, is adequate for any soiled linen.

(5) The issue of tetanus immunization is important. While the evidence is not entirely clear that tetanus immunization is required for patients with myiasis, patients with chronic wounds or skin lesions need to be checked to ensure that the individual's immunization for tetanus is up-to-date. This includes ascertaining that the patient has had primary immunization for tetanus, and

determining if the patient is suitable for Td (tetanus and diphtheria toxoids), or Tdap (tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine adsorbed) immunoprophylaxis, as recommended by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices for tetanus immunization found on web site <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5540-Immunizational.htm>).

(6) Lastly, it is to be noted that myiasis is not just a health care-associated occurrence; larval infestation of wounds can occur in the community before a patient presents to a health care facility. Patient groups predisposed to community-acquired myiasis include: the homeless, those with open skin lesions, those who are comatose, and those who are debilitated for any other reason. *NOTE: This Information Letter applies whether the patient has health care-associated myiasis or presents to the health care provider with community-acquired myiasis.*

7. Conclusion. Myiasis is an important condition in medical care, whether it is health care-associated or community-acquired. The hallmark of a myiasis program is an ongoing prevention effort that is multidisciplinary and includes the entire health care facility workforce. Through vigorous prevention strategies and mitigation efforts, myiasis can be addressed in a deliberate and appropriate manner. The key to success is continued and ongoing attention to appropriate prevention and control concepts with resolution of identified opportunities for intervention as they occur.

8. References

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i. VHA Program Guide 1850.2, Integrated Pest Management (IPM). October 5, 1998.
http://vaww1.va.gov/vhapublications/ViewPublication.asp?pub_ID=1093.

j. VHA Manual M-1, Part VII, Chapter 2.

k. VHA Manual M-1, Part VII, Chapter 4.

l. VHA Manual M-1, Part VII, Appendix 2D, Section F.

m. VHA Manual M-1, Part VII, Chapter 14.

9. Inquiries

a. For questions related to the clinical aspects of myiasis, contact the Office of the Program Director for Infectious Diseases at (513) 475-6398.

b. For questions regarding pest control, sanitation, and line, contact the Environmental Programs Service at (202) 565-8525.

c. For questions regarding general programmatic and safety issues, contact the National Center for Patient Safety at (734) 930-5890.

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Attachment

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ATTACHMENT A

FLY CONTROL IN HEALTH CARE FACILITIES

1. There are very few places where flies are less welcome than in a health care facility. Nevertheless, it is a setting that holds numerous attractions for them, such as the presence of food, moisture, and a temperate environment. Although sanitation measures in health care facilities are generally stringent enough to inhibit their breeding, the amount of human traffic in and out of a health care facility makes complete exclusion of the highly mobile adult flies extremely difficult. During warm weather, the adult fly population is ubiquitous in society at large. The fly is an opportunistic pest.

2. Sanitation is an important element of integrated pest management. There is to be an ongoing and concentrated effort to reduce the "bio-burden" of soil that is constantly being introduced into the health care environment. Appropriate sanitary practices such as timely waste removal, will eliminate fly breeding grounds and reduce the presence of flies in the health care facility. A proper sanitation plan has protocols that consider the following:

a. Routine inspection of all areas to determine what services are needed. It is essential to provide the right amount of effort at the right time to the most critical need.

b. Scheduled cleaning or waste removal, for specific areas, is appropriate if the soil and waste generation are consistent. However, with changes in waste generation and variation in waste composition, constant adjustment of effort brings efficiency and effectiveness to the environmental sanitation program.

c. The frequent collection, containerization, and removal of waste prevents the opportunity for pest infestation within, or around, the health care facility. Disposable waste container liners or the practice of consistent container and storage area cleaning further eliminates pest-breeding areas. **NOTE:** *The containers need to be equipped with lids.* Collection and storage areas need to be designed to both secure the waste and to enable easy and constant cleaning, e.g., self-closing and locking doors, floor drains, hot water bibs, glazed tile walls, and negative air pressure.

d. Dumpster areas may be problematic as they are often serviced by contractual arrangement, and the responsibility for cleaning and area policing are sometimes not well defined. The contract needs to specifically define the responsibility of the contractor in relation to pest control and sanitation. Local facility policy needs to address all pest control and sanitation issues not included in the contract. This area is to be well maintained in order to eliminate food and the harborage that serves to attract pests. The location of dumpsters and waste receptacles needs to be considered carefully to avoid close proximity to access points to the facility.

e. Flies are often attracted to decaying materials and off odors. Food trays need to be cleared promptly from the patient care areas. Forgotten food left in drawers can spoil; spoiled

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food in drawers needs to be discarded and the area sanitized. Soiled linens need to be changed promptly. If traps are used to mitigate a rodent problem, dispose of the carcasses before they start to decay to avoid attracting flies.

3. Mechanical or physical exclusion of flies from structures (including screening, caulking, self-closing doors, or barriers such as air curtains or flaps) coupled with positive air flow, and air intake controls, do much to prevent wholesale infestation; however, constant attention needs to be given to prevent the purposeful override of those exclusions. Individuals who open unscreened windows, prop open doors, leave litter, etc. are generally not aware that they are potentially affecting the well-being of the patients and employees. Consistent vigilance, education, and reinforcement are necessary.

4. If flies or other flying pests are observed in a health care facility, the staff needs to clearly understand the necessary procedures as a first step for mitigation.

a. The office and/or individual responsible for pest management needs to be notified immediately.

b. If it is possible to segregate the area, i.e., close a door so that the pest may be identified and eliminated, it helps to manage the situation.

c. A portable vacuum cleaner, equipped with a High Efficiency Particulate Air (HEPA) filter, is an excellent flying pest management tool and is recommended. In contrast, the use of space sprays, commonly used in residential settings, are seldom suitable in the presence of confined individuals who may be particularly sensitive to the potential toxicity of these chemicals, and may have allergic reactions. The fly swatter is also an inappropriate tool in a health care setting.

***NOTE:** Pesticide application for macro-organisms can only be performed by certified, licensed pest control personnel.*

5. The insect light trap (ILT), which introduces no chemical hazards to the environment and provides a continuous source of control, may be one of the most favorable options to prevent incursion of flying insects into the health care facility. Typically, large electrocuting models are used in combination with alcoves, vestibules, and air curtains at access points out of public view, such as entrances, receiving docks, storage areas, and waste collection, or holding points. ILTs utilizing glue-boards for silent capture are more appropriate for customer entrances and along all principal access routes used by the public. Smaller decoratively designed versions of this type are frequently used for aesthetic reasons to intercept flying insects in areas where their removal is more critical, such as the access routes leading to surgery, intensive care, and laboratories.

6. Additional resources concerning sanitation, waste management, and pest management policy are contained in subparagraphs 8(j), 8(k), 8(l), and 8(m) of the main Information Letter.